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(54) Title: DEVICES TO BE USED IN DENTISTRY UNITS AND OFFICES FOR HEATING AND HYGIEN

(57) Abstract: The following problems were solved using a heat resistant transparent glass shielded heater. That water at nonnal room temperature is ex1racted from the tip of the unit caps Viithout being heated may cause various problems. By connecting the subject device of invention to the systenl, warm water (35°C) can be given out of the tip of the cap, thus solving tOO aforementioned problem.Hot or warm wale: is generally required during tooth treatments. By using the second subject device of invention, it is possible to take hot or cold or wann water from the glass filler. When the injectors and ampoules used in anesthesia are cold, the patient may suffer pain during injection and sticking of the needle. By use of the device, the injector and ampoules are heated up to (33-36°C) and kept at the same temperature.

DESCRIPTION

Devices to be used in Dentistry Units and Offices for Heating and Hygien

The heat and hygiene of the water and medicines used in dental units and offices for miscellaneous purposes effect comfort and healthiness of medical treatment. As a result of the fact that Spit-basin glass filling system does not include a system for disinfection and heating of water, having the mouth agitated with cold water from city network during tooth cutting or bridge trials, using the water in cleaning of the cut tooth or decayed tissue by giving cold water from the tips of the hand pieces (air scaler, micro-motor, air turbine, air-water syringe) from city network and preparing the cavity or using the same in usual room temperature without heating injector or bulbs (≅36° C) effect the course and result of the treatment in various forms. These problems will be explained broadly when necessary.

We made use of the method of utilizing a heat-resistant heater with transparent glass shield and thermostat for the solution of these problems (Figure 1).

The heater consists of a pipe-shaped porcelain (2) with 100 W resistant wire (3) wrapped around placed within a heat-resistant transparent glass tube shield (1), thermostat regulation screw (5) comprising a notched brass axle mounted on a hard silicone chassis (4) and a spirally bent metal tape mounted on the hard silicone chassis which is serial connected to a thermostat mechanism (6). In addition, an indicator system was formed by parallel connecting the same properly to the aforementioned heater system by means of an indicator led (7) a resistant (8) and a capacitor (9) on the other end placed on the hard silicone chassis (4).

The hard silicone chassis on which the parts are mounted, is fixed by burying the same to some extent to the rubber lid (10) tightly covering the heat resistant transparent glass shield (1). When the rubber lid (10) is taken out by pushing, all of the components of the heat resistant transparent glass tube shield (1) are taken out along with the rubber lid.

Whole system remains inside of the rubber lid (10) including the part with the thermostat regulation button (11) on the thermostat regulation screw (5) consisting of a brass axle mounted on the hard silicone chassis (4) by notching on the same.

Although we will discuss one by one further in the following chapters, the general advantages of this heater are:

Capability of continuing to use the device by taking the heater out in case of a breakdown in electrical components (even if it is a sound system) without necessity to disassemble the heat resistant transparent glass tube shield (1) and the devices it is fixed to and without touching the mechanical system of the devices using merely hand and fingers, and thus being able to install the device in the heat resistant transparent glass tube shield either after being completely replaced if desired or after repair, if necessary by installing in the same manner into the heat resistant transparent glass tube shield (1) remaining in the devices.

Since the device is a low power one (100 W), and thus it would not attract much current, it can be used in any way in the units used in Dentistry.

The heater device is safe since the heat resistant transparent glass tube shield (1) is not conductive, and thus there is no risk of fault current. In addition, because the rubber lid (10) wraps up totally from the place remaining outside of the electrical components, even in case of a water leakage in the pipes in the spit-basin, the electrical components of the device would not be harmed resulting in a fault current toward the spit-basin. This is another important and positive point from the point of view of patient and physician safety of life in dentistry units and offices and prevention of treatment for such reason.

Besides, heat resistant transparent glass tube shield (1) is physically (its surface would not go bad in time because it has a hard and gleaming surface) and chemically (it would not be exposed to chemical interactions in time) stable. Since the heater surfaces are resistant to chemical and physical factors, the heater would not go ineffective in time due to reasons such as calcification etc.

Moreover, heat resistant transparent glass tube shield (1) bears various advantages to be mentioned when necessary with regard to use of the heater in devices since it allows penetration of visible and other beams. The device which we described above and listed advantages thereof and which we take advantage of as a heating method in the devices we use is a simple smooth type aquarium water heater device produced and sold in the aquarium market to be used in aquarium water heating.

As a method, the heater was used in various devices listed below which can be used for general purposes in Dentistry units and offices.

A- The Device Providing Supply of Warm (≅35°C) and Disinfected Water from the Tips of the Hand pieces.

Air scaler, ultrasonic vibration, micro-motor and air turbine hand pieces used in Dentistry units are used for lifting the decayed tissue and tooth cutting with rotation movement.

These devices are systems which take the energy for rotation and vibration from the pressurized air produced in the compressor system. In addition, the system sprays the water (k) from the pipes with the air pressure generated by the compressor from the water store of the unit from the tip of the hand piece (J) to prevent harm on the notch to be caused due to the heat generated on the notch worked upon and operated tips due to friction of the abrading or cleaning tips' (steel cavitron tips or steel and diamond freezes etc.) to the notch surfaces during vibration and rotation movements

Besides, the water allows more visible working area by sending away the decayed tissues, enamel and dentine tissues taken away from the teeth due to abrasion and spreads the dusts of the abraded tissue around, thus helping prevention of the risk of patient's and physician's being exposed to any infection.

It is applied by spraying the water of usual room temperature from the tips of the hand pieces in all of the domestic production systems. In other words, in systems produced within the country, such thing was not considered. Many of the systems produced abroad are also same. However, I've heard that there is an application of heating the water in the pressurized water store in some of the systems. There is the risk that the water getting out of the store in warm condition loses its temperature before it reaches the hand pieces and that heating in the volume under pressure harms the pneumatic hoses and connections.

In order to prevent the psychological reactions that the patient may have due to his/her fear and to realize the process in a more comfortable environment, it would be much useful that the water used during the processes mentioned above be near 35°C. In addition, for prevention of harming of the pulp (tooth essence) during processes, and precluding dentine sensitivity and pain resulting therefrom, you'd better use water at 35°C (Prof. Dr. İlhan Çuhadaroğlu Crown-Bridge Prosthesis p. 50 paragraph 1).

As I experienced in my 20-year clinical experience, during most of the year (except for a few months when the heat exceeds 40°C at shadow), using water at normal room temperature may result in dentine sensitivities at the end of cutting, and may cause problems due to pulp irritation and dentine sensitivity during and after decay cleaning and tooth cutting.

The device we have invented is one designed substantially to eliminate such problems and for prevention of problems that may arise between the physician and the patient in medical and psychological aspect to get the water supplied from the tip of the hand pieces as warmed up to 35°C.

The device we are using now:

1. During decay cleaning and performance of the fillings, it replaces anesthesia (local anesthetic injection for ceasing the pain) (nearly 90 %). Besides, it reduces to a great extent the following sensitivity claims after the filling process.

2. It allows working without anesthesia mostly during the tooth extraction processes (approximately 60 %). This causes great profits such as saving time, avoiding the complications (side effects) of anesthesia and less dentine sensitivity after extraction.

Figure 2 is a drawing showing a part of a dental unit (to the extent that it is relevant with our subject) bearing the device on a dental unit.

The system contains exclusion from the lid (12) side of the pot in the shape of cylinder (a, b, c, d, e, f, g, h) with a lid (12) of the tips of the four or desired number of thin copper pipe coils (14) wrapped up one on the top of another placed within a pot (13) with a lid in the shape of cylinder made of copper according to the needs. The heater with the heat resistant transparent glass tube shield (1) at the center of the pot is passed through a pipe-shaped extension (15) according to the heater environment heat with the thermostat regulation button (11). Inside the pot (16), the pot can be closed by using the screw (p) hole in the pot for filling the same with 40 % antifreeze and water mixture and then screwing the screw into its place having wrapped teflon for allowing homogenous heat environment and heat transfer. The device is screwed on two notched copper parts (m, n) soldered to the lower part of the same and fixed to the tablet cabin from inside.

The thin pneumatic hose (18) from the solenoid valve (17) commanding the water to each hand piece will enter from one end (c) of the copper pipe coil entering the device in question and will be connected to the hand piece connection hose (19) on the other side of the copper pipe. When the solenoid valve (20) commanding the pressurized air by pressing the foot command pedal and the solenoid valve (17) commanding the pressurized water from the store of the unit are opened, the pressurized air will reach the hand piece (J) and provide operation of the hand piece, and the water from the solenoid valve (17) commanding the pressurized water will enter from the end of the copper pipe coil (c) and proceed by being heated through the copper pipe within the pot heated with the heater and will go out heated on the other end (d) and from there, will reach by means of the hand piece connection hose (19) from there directly to the hand piece (J) and the arm water will be sprayed from there to the working area with its pressure (k). After the water wents out of the heater pot, since it will lose some heat before it reaches the hand piece, the thermostat of the heater will be regulated in a way that it would be a little bit more as compared to the desired temperature taking into consideration the environmental heat.

Same type of connections can be made for other hand pieces from the tips pertaining to (a and b, e and f, g and h) each of the other copper pipes and warm water can be used in the exit of the other hand pieces.

The heater is connected to 220 V city network electricity (24) by means of cleamance connections within the Unit by being serially connected with a turn on/off button (21), thermostat (22) which can turn on and off the device according to the environmental temperature (for example adjusted to 35 °C environmental temperature) and a two amper fuse (23) as seen in figure 2.

In addition, a thermometer (25) will be fixed onto the upper outer part of the device subject to the invention for checking the thermostat regulation and outer device will be coated with suitable materials for heat insulation of the same (isoglass, strophore or thick rubber coat etc.). This will also ensure that the device operates more efficiently and economically.

The advantages of the invention:

a- This invention can provide water output with one single device to all of the hand pieces (air scaler, micro-motor, air turbine, air-water syringe) including the air-water syringe at suitable temperature (approximately 35°C).

b- The invention performs the heating process of the water from closest point possible between the hand piece (J) and the solenoid valve (17) commanding the water to the hand piece and gives heated water directly into the hand piece connection hose (19). Thus, the heat loss of the heated water while going to the pneumatic hand piece (J) is reduced to a minimum and the period between starting of the hand piece and beginning of the warm water's leaving the hand piece would be reduced to a minimum. This is because, when you first start working, the water remained between the hand piece and the device which got cold would be discharged. However, hot water will start coming only after that. This is about 7 seconds in the system which is our invention. If, for example, the heating process was performed in the

main water store, which is the most distant point, a time period like 2-3 minutes would be necessary in order for the heated water to reach the hand piece, which practically means that the desired event would not take place. Both when you start first operating, and when you restart operating the hand piece for other processes, it is not practical and it is even not possible. In addition, because the heating system is in a place where the pipes and store are in a region under constant pressure, that may lead to leakages and breakdowns in the hoses and records, which will consequently cause adverse conditions such as loss of time.

c- In our system in models which the hand pieces are connected to the tablet with the tailed system, the time needed for the water leaving the device being heated to reach the tip of the hand piece can be reduced to a duration like four seconds by being shortened approximately three or four seconds with correct mounting of the device toward the lower part of the hand pieces of the device.

Other advantages of the invention is that it is not hard to install it within the tablet it is mounted on the hand pieces because a low-power (100W) heater with heat resistant transparent glass tube shield (1) is used, no problem would arise in the interior installation because it would not attract much current. The device is serially connected from the phase input with a 2A fuse (23) to eliminate any possible inconvenience. The sizes of the device is small enough to be easily fit into the unit. Even if there is a breakdown in the electrical components (very important for the life safety of the patient and physician), there will be no fault current in the mechanical components. In addition, if some breakdown in the electrical components of the device takes place (even if it is a quite sound system), it is possible and easy to repair and replace the electricity component without touching the mechanical system.

Another advantage and profit of the device which is our invention is that both the patogens that may exist in the water from the store to the hand pieces and most of the infection factor microorganisms that may exist both in the store to the hand piece which may spread from the air in the medical office and mouth (TDBD number 58, p 29) (Prof. Dr. Güven Külekçi, prof. Dr. Sertar Çintan, TDBD number 58, 91, p 93) to the pipes as a result of backward flow are killed to reduce infection risk by heating the water while passing through very long thin copper coils (14) and due in particular to the strong oligodynamic effect of the copper (Prof. Dr. Ekrem Kadri Unat, General Medical Microbiology and Infection Diseases Science, p. 113). To strengthen this oligodynamic effect, we fit silver wire of certain length to the exit part at the hand piece side of the copper pipe.

The device in question providing warm water from the hand pieces can be used in newly manufactured units by being manufactured the invented device being attached.

It can be separately manufactured to be added to the currently used units in required conditions. It is an easy process to apply in both manners.

B- Water Heater and Disinfector Device for Spit-basin Glass Filler System:

The system in the spit-basin for the patient's shaking his/her mouth, opened and closed with a solenoid valve in cases where necessary for treatment in units used in glass filler dentistry (tooth cutting, filling etc.). The patient shakes the water in his/her mouth from the glass filled thanks to this system. In the system we invented, the water is given to the glass after being heated (up to approximately 60°C) within a small store mounted in the spit-basin.

There is still no water heater for this glass filler system in units manufactured within the country. Thus, there is a deficiency in this field.

The small water store which can easily fit into the spit-basin is heated by means of a heater with low power and (100W) glass shield. The glass is physically (its surface would not go bad in time because it has a hard and gleaming surface) and chemically (it would not be exposed to chemical interactions in time) stable. Since the heater surfaces are resistant to chemical and physical factors, the heater would not go ineffective in time due to reasons such as calcification etc.

Another superiority of the device is that in case of a breakdown in the electrical components (although it would not break down easily) of the heat resistant transparent glass shield (1) heater, it is possible and easy to take out

and repair, and replace the electrical components without touching the mechanical system.

As a matter of fact, since the used heater is a low power one (100 W), it would not attract much current and thus it is not risky to use it by mounting the device within the spit-basin. Since immediate water heater systems include high power (approximately 2-3 KW) resistances, it is more practical to keep the water in a store in the spit-basin having preheated the same, and use when necessary.

A heater containing such heater can be mounted to the closest point to the exit and since this will cause the water's reaching the glass with the least heat loss, it is appropriate as a method to use a store containing such a heater.

In addition, the device is fixed to a point of the system between the solenoid valve (30, 38) and glass filler (51), which is not under pressure. This reduces the risks of both mounting and use. (Heating in places under pressure would increase fault current risk in hose-record connections etc.)

This system is advantageous with regard to the life safety of the patient and patient since there would be no risk of fault current in cases of short circuit, breakdown or in any other case because the glass shield is not conductive.

In general, warm or hot water is necessary during tooth treatments. In cases when there is no such option in the system, hot water is taken to the patient by either having heated from the kitchen or it is neglected. Shaking the mouth with cold water during tooth cutting, during metal or completion trials of the patients whose teeth had undergone biodent crown bridge, in metal dentine and completed work fittings of the porcelain bridges and in similar conditions would cause pain in the teeth and pulp irritation. Besides, cold application of the teeth coming from the laboratory for metal or dentine trial to the mouth will cause toothache.

Such pain not only cause various inconveniences in dentist-patient relations but also cause disadvantageous results with regard to tooth health (Prof. Dr. İlhan Çuhadaroğlu, Crown -Bridge Prosthesis p. 79).

If the glass filler system has the warm and cold water option, there would be no pain in shaking the mouth, and in metal or dentine trials, pain is prevented when bridge or crowns are applied to the mouth having immersed into the warm water in the glass. The events we mentioned above take place in all of the year, but more in cold seasons.

Moreover, during bleeding processes such as extracting tooth, cleaning of tooth stones, it is useful that the mouth shaking water is at normal tap water temperature [since hot or warm would open the veins and increase bleeding (vasodilation)]. Besides, it is more useful to use water at normal tap temperature for mouth shaking after local anesthesia process. (In this case, applying hot or warm water opens the veins and accellerates blood circulation and causes faster absorption of the body of the injected medicine and increasing of its toxicity and faster ending of the anesthetic effect). Comparably, in pulpitis purulenta case, shaking the mouth with cold water would reduce the pain, however, hot water application would cause severe pain (Prof. Dr. Turan Cengiz, Endodonti, p. 141).

In addition, since the water of the unit is the water from the city network, it is not sterile. Microorganisms in this water may constitute a biofilm layer in the pipes of the system and may reach to the mouth of the patient by menas of the water used in the glass filling system of the unit. The patient may cause passing of the same to the water by way of retraction. The water used by the system is a reason of spreading for not only the patient but also the physician and assistant personnel. Some of the infections spread by this way (pseudomonas, legionella) are cited in the literature (Asc. Prof. Mine Cambazoğlu, TDBD 58th Special Edition, p. 72). (In addition, Focus magazine dated July 2001, p. 25).

Figure 3 is a drawing showing some of a tooth unit spit-basin bearing the device of this invention.

The device consists of two sections one (A) for supplying disinfected and heated water for the water filler system of the spit-basin and one (B) for disinfecting the normal water from the city network and giving to the glass filler system.

The section supplying disinfected and heated water for the spit-basin glass filler system (A), consists of a copper pipe in proper size (26) and a copper upper lid (29) on which there is a record (28) for the hose (27) to convey the water from the device to the glass, on which there is a resistance wire (3) of the heater wrapped around a pipe-shaped porcelain (2) and other electrical components, through which the heater with heat resistant transparent glass tube

shield (1) is passed and placed within the store, which contains a pipe-shaped extension (15) of appropriate dimension and a lower lid (35) on which a proper connection component (34) was fixed by notching and screwing, on which a record (32) for the pneumatic water hose (31) from the solenoid valve (30) and in which a suitable size silver bar (33) were placed in an isolated manner. The records on the lids (28 and 32) are fixed by tightening and screwing the records on the lids and the ready-sold brass records onto the copper upper (29) and lower lid (35).

The part (B) disinfecting and giving the normal water from the city network to the glass filler system consists of an appropriate size copper pipe (26) and a copper upper lid containing on it a record (28) for the hose (36) fit onto the same which will carry the water from the store to the glass, a 6 W fluorescent ultraviolet beam source (37), a pipe-shaped extension (15) through which the heat resistant transparent glass tube shield (1) is passed and placed within the store, and a lower lid (35) on which a record for the pneumatic water hose (39) coming from solenoid valve (38) and a suitable connection component (34) on which an appropriate size silver bar (33) is placed in an isolated manner are fixed having notched and screwed. The records (28 and 32) on the lids are fixed by screwing and tightening the records (28 and 32) on the lids and ready-sold brass records onto the copper upper (29) and lower (35) lid.

41The upper (29) and lower (35) lids are fit onto the copper pipe (26) and a brass axle (40) notched on both edges in appropriate size advancing through the hole in the middle of the lower lid (35) is screwed and slightly tightened to the salient part in the shape of a nut fitting the notches on the axle in the inner part of the upper lid (29), then, the body part of the device will be constituted by placing and slightly tightening with a nut (43) fitting the notches of the axle (40) a brass washer (42), the hole diameter of which fits the axle to the part of the axle (40) corresponding to the lower lid (35). All known materials will be used to prevent leakage between assembled parts (silicone, teflon, locktite 542 etc.).

The outer surfaces, upper lid (29), lower lid (35) of the device, the copper pipe (26) and brass axle (40) constituting the body of the device are made entirely of copper and brass, that is, oligodynamic (antibacterial) material (Prof. Dr. Ekrem Kadri Unat, Infectious Diseases and Epidemics, p. 113). Besides, to make use of the oligodynamic effect of silver, which is an aligodynamic (antibacterial) element, (Prof. Dr. Ekrem Kadri Unat, Infectious Diseases and Epidemics, p. 113), the microbes that may exist in the water to the glass or that may reach the store by being spread from the air in the medical office by means of the hose to the glass (Asc. Prof. Mine Cambazoğlu, TDBD special 58th edition p. 72) are killed as much as possible by fixing a silver bar (33) of appropriate length into the device, which is placed within an appropriate connection element (34) in an isolated manner by notching the lower lid of the store to prevent possible infections. The antibacterial effect will be further increased due to the galvanic current and ionization of the water within the device because of the isolated silver bar (33) and the copper outer surfaces of the device (29, 35, 26).

The 6 W fluorescent ultraviolet beam source (37) placed in the heat resistant transparent glass tube shield (1) for further disinfection of the water in the section disinfecting the normal water from city network and giving it to the glass filler system (B) shall be properly connected to a starter (44) apt to its power and ballast and serially connected with a button (46) controlling the heater and the fuse (23) circuit. Since the 6 W fluorescent ultraviolet beam source (37) placed within the heat resistant transparent glass tube shield (1) in the section disinfecting the normal water from city network and giving to the glass filler system (B) causes heating of the water in the device to some extent, use of this light source (37) can be completely cancelled [because in this section of the device (B), the water to be poured to the glass is aimed to be cold water at the same temperature as normal water from city network for use in suitable points in treatment] or can be connected with a time regulation circuit and may be made to blink, for instance, at one minute intervals. Even if the use of this light source (37) is completely cancelled, the oligodynamic (antibacterial) effect of the copper pipe (26) and copper upper (29) and copper lower (35) lids constituting the main body of this section of the device (B) in addition to the further oligodynamic effect of the silver bar (33) placed in an isolated manner to into the device will disinfect the water from this section of the device (B) to the glass filler system.

The water in the store will be more substantially disinfected as a result of emanating in the water within the device of the heat (≅57°C) generated by the heater in the section providing disinfected and heated water for the spit-basin glass filler system (A) in the water in the device and the visible beams from the resistance of the heater and ultraviolet and other radiation in these beams, having passed from the heat resistant transparent glass tube shield (Prof. Ekrem Kadri Unat, General Medical Microbiology and Infection Diseases Science, p. 104).

It is also possible that the body (26, 29, 35) of the device be produced using PVC material. We manufactured this store by both methods.

After the short sides of the two {T}-shaped clamps (47) cut in appropriate sizes in both sections of the device (A and B) are screwed from appropriate holes and over a rectangular shaped washer to the inner part of the spit-basin cabin and bent downward, by fixing and screwing the heater device from upper and lower side between the clamp bars, they will be fixed side by side into the spit-basin cabin in a way that they are parallel.

The store manufactured in the same manner can be suitably modified and used for disinfection purposes in the same way as a pressurized water store (p. 2, 3) supplying water to the hand pieces of the unit.

Operating of the device supplying disinfected and heated water for spit-basin glass filler system (A); as in conveyance of the normal water from the city network, the water advancing as a result of the water network pressure through the pneumatic water hose (31) connecting the solenoid valve and device, by pressing the button (49) properly connected with a time regulation circuit (48) and opening of solenoid valve (30) controlling the incoming water (opening and closing) with a hose (50) from the city network for a given period (11-12 sec), enters the device (A) containing the water heated with the thermostat heater with heat resistant transparent glass tube shield (1) and will cause increasing water pressure there, and as a result of such water pressure heated up to a temperature which can be adjusted as desired (preferably≅57°C) with a thermostat regulation button (11), will advance by stimulation of this pressure through the hose (27) connecting the device to the glass filling part (51) on the spit-basin and flow outside with the same pressure to fill the glass under it (52). On closing of the solenoid valve at the end of the time regulation period, the water flow will come to an end.

As to the part disinfecting and giving the normal water from the city network to the glass filler system (B), it is connected with the solenoid valve (38) and pneumatic hose (39) controlling and taking to the glass filling system the normal water from city network preexisting in the system by means of the record (32) on the lower lid (35). The part of the pneumatic hose (36) on the side of glass filler will be bound to the record (28) on the upper lid (29). The hoses (27, 36) carrying the water to the glass originating from both sections (A and B) will be united with a three-path unifier (53) and by means of the pneumatic hose (54) connected through the third tip of the three-pat unifier to the glass filler part (51). Thus, the part of the device providing disinfected and heated water for the spit-basin glass filler system (A) and the part disinfecting the normal water from city network and giving to the glass filler system (B) are parallel linked. Besides, a valve (55, 56) on each of the pneumatic hoses (31, 39) taking water to both sections of the device (A and B) is fixed to ensure regulation against the daily pressure changes in the city water network and adjustment of the filling ratio of the glass at the end of the time regulation period (approximately 2/3).

In this case, when pressed onto the button (58) commanding the solenoid valve (38) controlling the water coming to the section disinfecting and giving to the glass filler system the normal water from city network (B) by means of the time regulation device (57), the glass will be filled with disinfected network water from the (B) section of the device. When the button (49) controlling by means of the time regulation device (48) the solenoid valve (30) controlling the water coming to the section (A) providing disinfected and heated water for the glass filler system, the glass will be filled with disinfected and heated water from (A) section of the device. If the button (59) controlling directly without time regulation the solenoid valve (38) of the water coming to (B) section of the device is pressed simultaneously, the hot water in the glass will be warmed.

The resistance wire (3) and ultraviolet beam source (37) circuits of the device are serially connected with a 2-

amper fuse (23) and a turn on/off button (46) in a way to be parallel to each other and will be connected to the normal city electricity by means of the clamps in the spit-basin cabin.

The buttons shown in various places in the drawing (46, 49, 58, 59) can be placed in various locations in a way to be appropriate with regard to ergonomic use on the spit-basin cabin and set. Two or more buttons with the same function can be placed with parallel connection. Electronic one-touch buttons can be used. I find it unnecessary to detail the issue because it remains outside the subject.

The valves (55, 56) regulating the amount of water to pass through (A) and (B) section of the device will be directly adjustable from outside without necessity to open the spit-basin cabin and can be mounted on the cabin to be ergonomic for dentist's use.

The subject device of the invention may be used in newly manufactured units as an additional part.

In necessary conditions, it can be separately manufactured for adding to the units currently used. Both uses are easy.

C- Device Heating the Injector and Ampoules and Having Ready for Use at 36°C.

Surgery may require anesthesia for ceasing the pain during treatment and prosthetic tooth cures. When the injectors and ampoules used in anesthesia application are cold, they cause sense of pain in the patient at the time of injection (Prof. Suphi Konukman, Anesthesia in Dentistry, p. 121, Prof. Geoffrey L. Howe, F. Ivor H. Whitehead, Local Anesthesia in Dentistry, p. 81). The lower the temperature of the injected solution compared to the body temperature (≈36.5°C) is, the higher the pain is, and vice versa. If the temperature of the solution is equal to the body temperature, the pain will diminish substantially.

In normal practice, the anesthetic solution is drawn in the injector without exposing to any process, and injected as it is. Naturally, this kind of practice causes pain in the patient. From time to time, if the dentist is sensitive about this issue, he/she applies the medicine after having kept on a heat source for some time and heated the ampoule, however, the desired result cannot be achieved since he/she cannot make exact adjustment of the temperature. However, if the heat of the environment is 36°C or above, (this may happen in July and August), this process is not necessary.

Even though the invention is produced considering dentistry field as primary interest, it can also be used in ready storage of medicines used in injections to the other parts of human body in other health institutions.

The device may also be used for realization of processes such as better painless simentation etc. by getting the crown bridges cleaned, dried and prepared for simentation until siman is prepared.

The device subject to the invention is merely my idea and there is no device in our country produced for the same purpose. I did not hear anything about this subject. I have not heard that there is a device or apparel abroad produced for the same purpose.

The advantages of the device is that since it uses a heater with low power (100 W) with glass shield (1), its energy cost is very low and economic. In addition, the heater is safe in terms of fault current etc. In addition, although it is hard that a breakdown may occur in the electrical components of the heater, repair or entire replacement of electrical components is possible and easy without touching mechanical equipment.

The device we invented keeps the temperature of the injectors and ampoules between 33-36°C ready for use at any time desired. If the environmental temperature is 36°C or over, the heater of the device is disabled automatically and no problem is encountered. Consequently, there is no problem of turning the device off when it gets hot and turning it on when it gets cold.

Figure 4 shows the technical drawing of the invention. The figure at the bottom of the page is the bird's-eye view of the device, and the drawing on the top of the page are the perspective appearance of the same.

The device contains a covered pot (60) made of a brass plate in the shape of a rectangular prism in appropriate sizes and a short-pipe-shaped extension (15) in suitable diameter for placing within the device having passed through the low power (100 W) heat resistant transparent glass tube shield (1) thermostat heater on the short side edge of the

prism as well as a brass plate extension (62) at the lower edge, of the same width of the lower edge of the prism where the electrical connection clamps (61) of the heater are fixed onto. In order to ensure homogenous heat transfer and distribution, pursuant to fixing with appropriate adhesive substances within the device having passed through the short-pipe shaped extension (15) in suitable diameter of the heater with heat resistant transparent glass tube shield (1), after notching the same edge and drilling a fixed screw hole (p) through which water containing 40% antifreeze (63) is filled, the covered space where the heater is placed is fixed by screwing the screw (p) by wrapping teflon around and slightly tightening the same, to result in storing the water within the covered space. Four axles (64), which are turned into screws by notching the edges on the upper edge of the prism are fixed by drilling and properly notching the brass plate with these four axles and then screwing the axles and soldering the same. On the upper side of the prism, a stainless chrome apparel tray (66) in appropriate dimensions (enough to contain ampoules and injectors adequate for daily use) containing four holes (65) aligned with the screw-shaped extensions (64) with the same base dimensions as the upper part of the prism and fixed on the prism was fit and fixed on the screws by placing and tightening the nuts on. It will be covered in a way that can be opened and closed when required with a stainless chrome lid (68) with a handle (67) apt to the ceiling size in a way to keep the heat in for preservation of homogenous distribution and preservation of heat generated in the tray. In addition, the stainless chrome hatch (70, shown with interrupted lines in the drawing) covering the brass plate extension (62) where the electricity connections are fixed on the device where the turn on/off button of the device (69) is fixed to the base by screwing from the appropriate holes. This hatch contains at the back of the device a hole (72) somewhat large enough to turn the thermostat regulation button (11) with fingers and a small hole (71) from which the plug cable of the device can be taken out. Coating the lower and side parts of the device with heat insulating materials would result in more efficient and economic operation of the device.

In addition, a thermometer (25) will be fixed into the apparel tray (66) in which ampoules and injectors will be placed for thermostat regulation and control.

The heater of the device will be serially connected with a 2 A fuse (23) and a turn on/off button (69) and will be used by plugging into a 220 V electricity socket over the cable (73) and plug (74). Pursuant to adjustment of turn off temperature of the thermostat as 36°C via the thermostat regulation button (11), and placement of daily amount of local anesthetic ampoules and injectors, the device will be operated starting by pushing the turn on/off button (69) having plugged the same (74).

The device can not only be put to use having been produced as an independent unit but also may be produced and used as mounted ergonomically in terms of medical office practice within an appropriate drawer in the drawer table systems used in the medical offices.

The device can be submitted to use being produced.

CLAIMS

1. A device for heating aquarium on the market consisting of a pipe-shaped porcelain (2) placed within a heat-resistant transparent glass tube shield (1) with resistance wire of 100 W power (3) wrapped around the same serially connected to a thermostat mechanism (6) consisting of a thermostat regulation screw (5) comprising a brass axle mounted on a notched hard silicone chassis (4) and a metal tape mounted on the hard silicone chassis by being spirally bent the purpose of which is usage in heating and hygiene devices to be utilized in dentistry units and offices as a method.

2. The device specified in Claim 1 with features of usage in disinfection of miscellaneous liquids by placing an ultraviolet light source (37) instead of heater resistance (3) within the heat resistant transparent glass tube shield (1).

3. The device specified in Claim 1 with features of capability of taking the heat resistant transparent glass tube shield (1) and devices fixed inside without necessity to any disassembly and without touching the mechanical system of devices using solely the hand and fingers and thus being able to continue using the device by installing the same in the same manner in the heat resistant transparent glass tube shield (1) either after it is completely changed or after repair, if necessary, in case of any breakdown in electrical components (in spite of the fact that it is a strong system) in the heat resistant transparent glass tube shield (1).

4. The device specified in Claim 1 with features of using in any manner in the units used in Dentistry without a risk since it would not attract much current because of its low power.

5. The device specified in Claim 1 with features of being safe because there is no risk of fault current since the heat resistant transparent glass tube shield (1) is not conductive.

6. The device specified in Claim 1 with features of no productivity decrease in time due to reasons such as oxidizing, rusting, calcification as a result of the fact that the surfaces of the heat resistant transparent glass tube shield (1) are quite resistant against the chemical and physical factors.

7. The device ensuring the tips of the hand pieces giving out warm (≅35°) and disinfected water with feature of being a system giving out from the lid (12) side of the cylinder-shaped pot of the tips (a, b, c, d, e, f, g) of four, or according to the requirements, desired number of thin copper pipe coils (14) wrapped around one on the top of another placed within a pot (13) with a lid (12) in the shape of a cylinder made of copper. The heat resistant transparent glass tube shield (1) in the center of the pot is placed in the center of the pot from the other end of the pot passing through a pipe-shaped extension (15) fitting its own diameter. The heater environment can be adjusted to desired temperatures using a thermostat regulation button (11) as per the state of the environmental heat. The pot will be closed by tightening the screw into its place by wrapping teflon around after having filled inside of the pot (16) from the screw (p) hole on the pot with 40% antifreeze and water mixture to ensure a homogenous heat atmosphere and heat transfer. The device will be fixed from inside to the cabin of the tablet section of the unit by screwing on two notched and drilled copper pieces (m, n) bent in the form of L after having soldered on the lower part.

8. The device specified in Claim 7 with the feature of performing the heating process of the water to the hand piecess of the device by using the method of passing the water by means of thin long copper pipes (14) through another liquid heated using a heat resistant transparent glass tube shield (1) to some desired extent.

9. The device specified in Claim 7 with the features of passing the water to each hand piece through a long thin copper pipe (14), in addition, preventing infections by killing most of the microorganisms in the water to the hand pieces because of the oligodynamic effect of the silver wire fitted inside the copper pipes and copper pipes as well as heating of the water passing through the pipes.

10. The device specified in Claim 7 with features of heating and disinfection the water to all of the hand pieces (Air scaler, micro-motor, air turbine, air- water syringe etc.) of the device with one single device.

11. The device specified in Claim 7 with the feature of performing the heating process of the water to the hand pieces of the device from a point closest to the hand piece (J) between the solenoid valve (17) and hand piece

connection hose (19) as far as possible. (The device gives the heated water directly to the mouth of the hand piece connection hoses in unit part). Therefore, heated water can be obtained in the tip in the shortest time possible.

12. The device specified in Claim 7 with the feature of performing the heating process of the water to the hand pieces of the device only from a section between the solenoid valve (17) and hand piece connection hose (19) where the operated hand piece receives partial pressure at the time of operation.

13. The device being the one which provides (A) disinfected and heated water for spit-basin glass filler system and which gives (B) normal city network water to the glass filler system having disinfected, has the feature of consisting of two parts, one (A) providing disinfected and heated water to the spit-basin glass filler system and the other (B) giving the normal water from the city network to the glass filler system having disinfected.

31The part supplying disinfected and heated water for the spit-basin glass filler system (A), consists of a copper pipe in proper size (26) and a copper upper lid (29) on which there is a record (28) for the hose (27) fit on the pipe to convey the water from the device to the glass, in which there is a resistance wire (3) of the heater wrapped around a pipe-shaped porcelain (2) and other electrical components, through which the heater with heat resistant transparent glass tube shield (1) is passed and placed within the store, which contains a pipe-shaped extension (15) of appropriate dimension and a lower lid (35) on which a proper connection component (34) was fixed by notching and screwing, on which a record (32) for the pneumatic water hose (31) from the solenoid valve (30) and in which a suitable size silver bar (33) were placed in an isolated manner. The records on the lids (28 and 32) are fixed by tightening and screwing the records on the lids and the ready-sold brass records onto the copper upper (29) and lower lid (35).

The part (B) disinfecting and giving the normal water from the city network to the glass filler system consists of an appropriate size copper pipe (26) and a copper upper lid containing on it a record (28) for the hose (36) fit onto the same which will carry the water from the store to the glass, a 6 W fluorescent ultraviolet beam source (37), a pipe-shaped extension (15) through which the heat resistant transparent glass tube shield (1) is passed and placed within the store; and a lower lid (35) on which a record (32) for the pneumatic water hose (39) coming from solenoid valve (38) and a suitable connection component (34) on which an appropriate size silver bar (33) is placed in an isolated manner are fixed having notched and screwed. The records (28 and 32) on the lids are fixed by screwing and tightening the records (28 and 32) on the lids and ready-sold brass records onto the copper upper (29) and lower (35) lid.

14. The device specified in Claim 13 with the feature of performing the water heating and disinfection process of the water to the glass filler (51), from the point closest to the glass (52) between the solenoid valve (30) and glass filler (51).

15. The device specified in Claim 13 with the feature of performing the process of heating and disinfection of the device in a place which is not under pressure between the solenoid valve (30) and glass filler (51).

16. The device specified in Claim 13 with the features of oligodynamic effect of the copper pipe (26) and lids (29, 35) comprising the outer surface of the silver bar (33) and brass axle (40) in the store, and preventing the probable infections as much as possible by killing substantial part of the pathogen microorganisms which may multiply in the water from the store to the glass or in the store reaching there from the glass filler.

17. The device specified in Claim 13 with the features of capability of the visible beams' emanating from the resistance (3) of the heater and the ultraviolet and other radiation's passing through the heat resistant transparent glass tube shield (1) and emitting in the water within the device to provide substantial disinfection of the water with the helpful effect of the heat emanating from the resistance (3).

18. The device specified in Claim 13 with the feature of obtaining cold or hot water or warm water in the desired temperature by integrating the device with the present glass filler system (38, 39, 58, 59, 60, 52).

19. The device heating the injectors and ampoules and keeping ready for use at (≅ 36°) with the features of containing a covered pot (60) made of a brass plate in the shape of a rectangular prism in appropriate sizes and a short-pipe-shaped extension (15) in suitable diameter for placing within the device having passed through the low power (100

W) heat resistant transparent glass tube shield (1) thermostat heater on the short side edge of the prism as well as a brass plate extension (62) at the lower edge, of the same width of the lower edge of the prism where the electrical connection clamps (61) of the heater are fixed onto. In order to ensure homogenous heat transfer and distribution, pursuant to fixing with appropriate adhesive substances within the device having passed through the short-pipe shaped extension (15) in suitable diameter of the heater with heat resistant transparent glass tube shield (1), after notching the same edge and drilling a fixed screw hole (p) through which water containing 40% antifreeze (63) is filled, the covered space where the heater is placed is fixed by screwing the screw (p) by wrapping teflon around and slightly tightening the same, to result in storing the water within the covered space.

20. The device specified in Claim 19 with the feature of being designed and manufactured to heat the injectors and ampoules up to the human body heat and to keep at the same temperature ready for use.

21. The device specified in Claim 19 with the feature of being big sized enough to store anesthetic ampoules and disposable injectors adequate for daily use of the tray of the device (66).

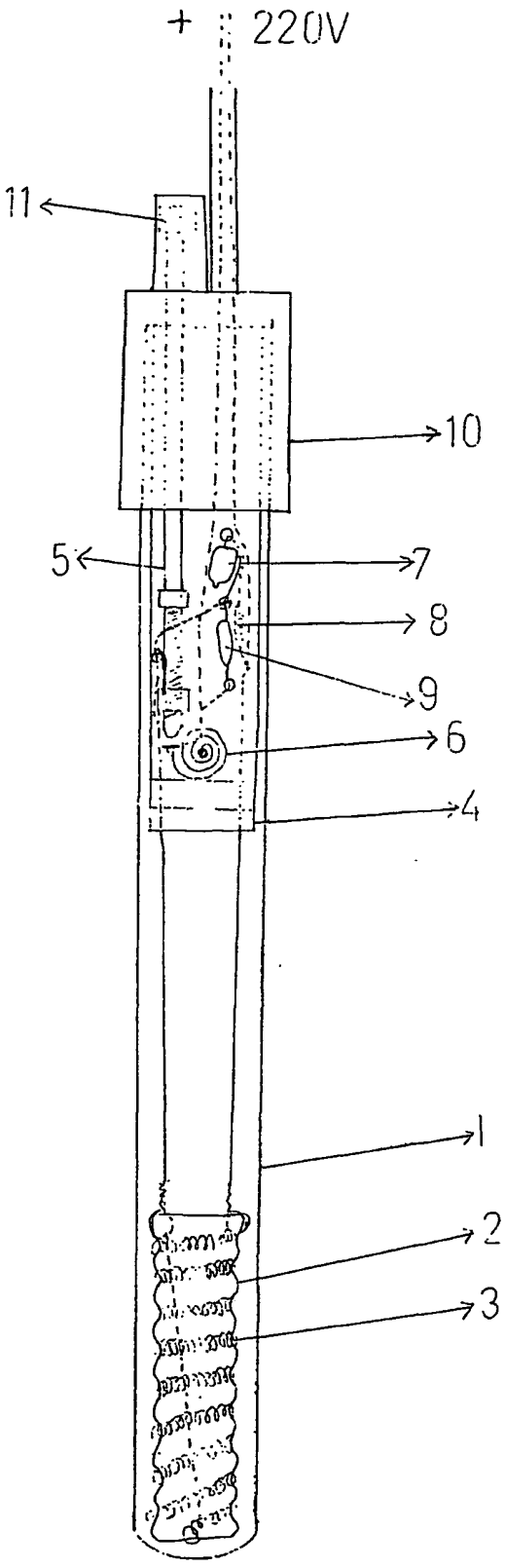

FIGURE 1

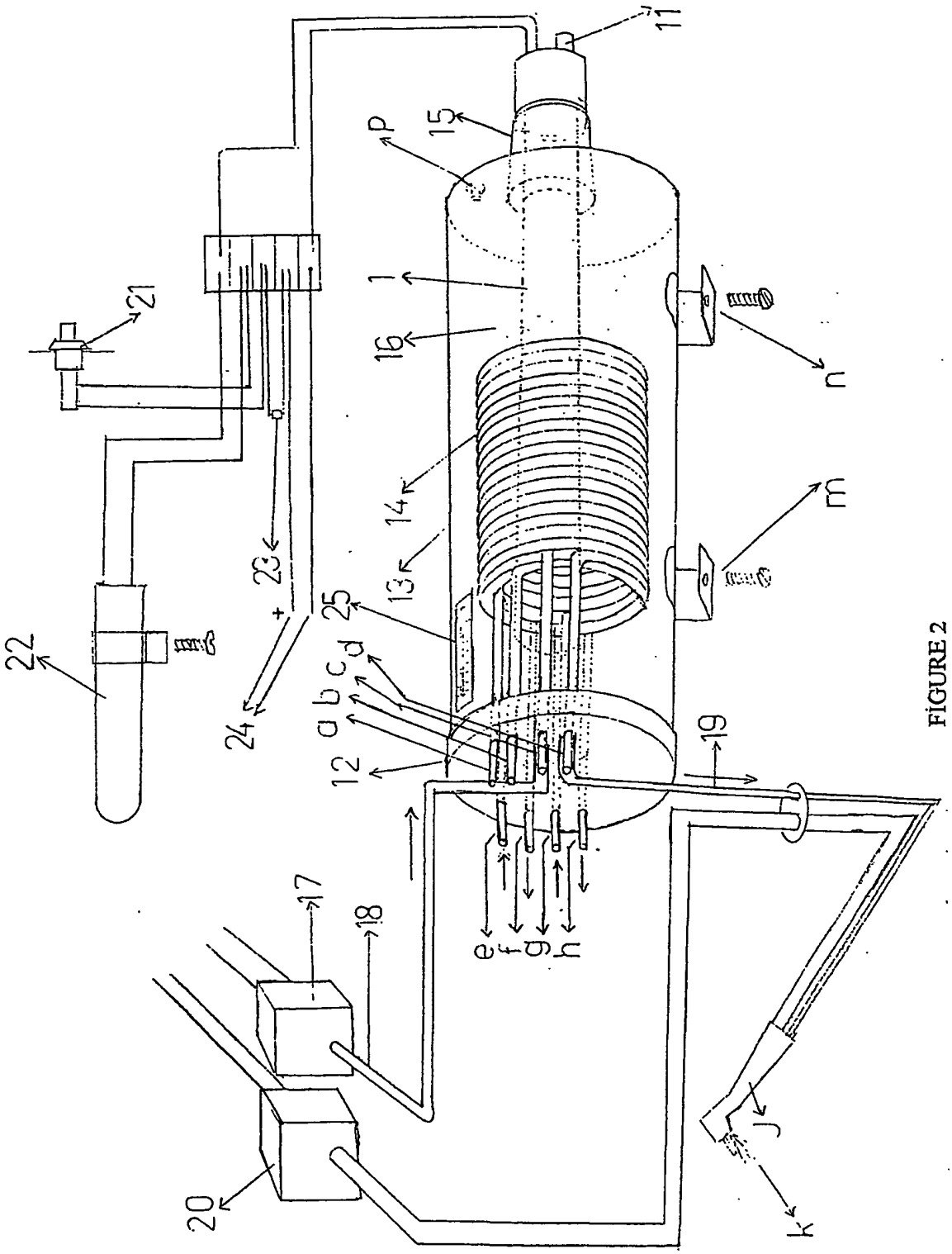

FIGURE 2

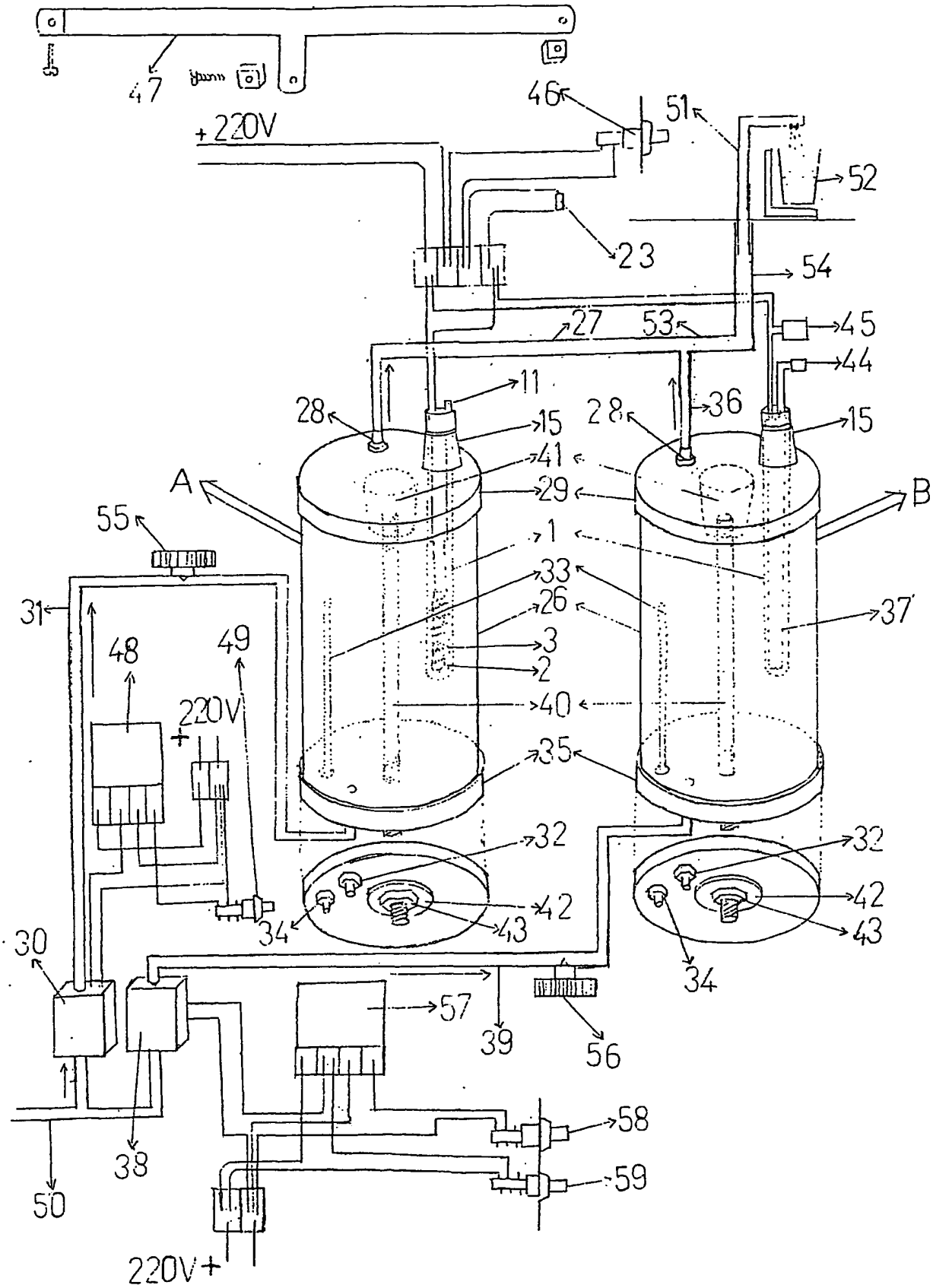
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FIGURE 3

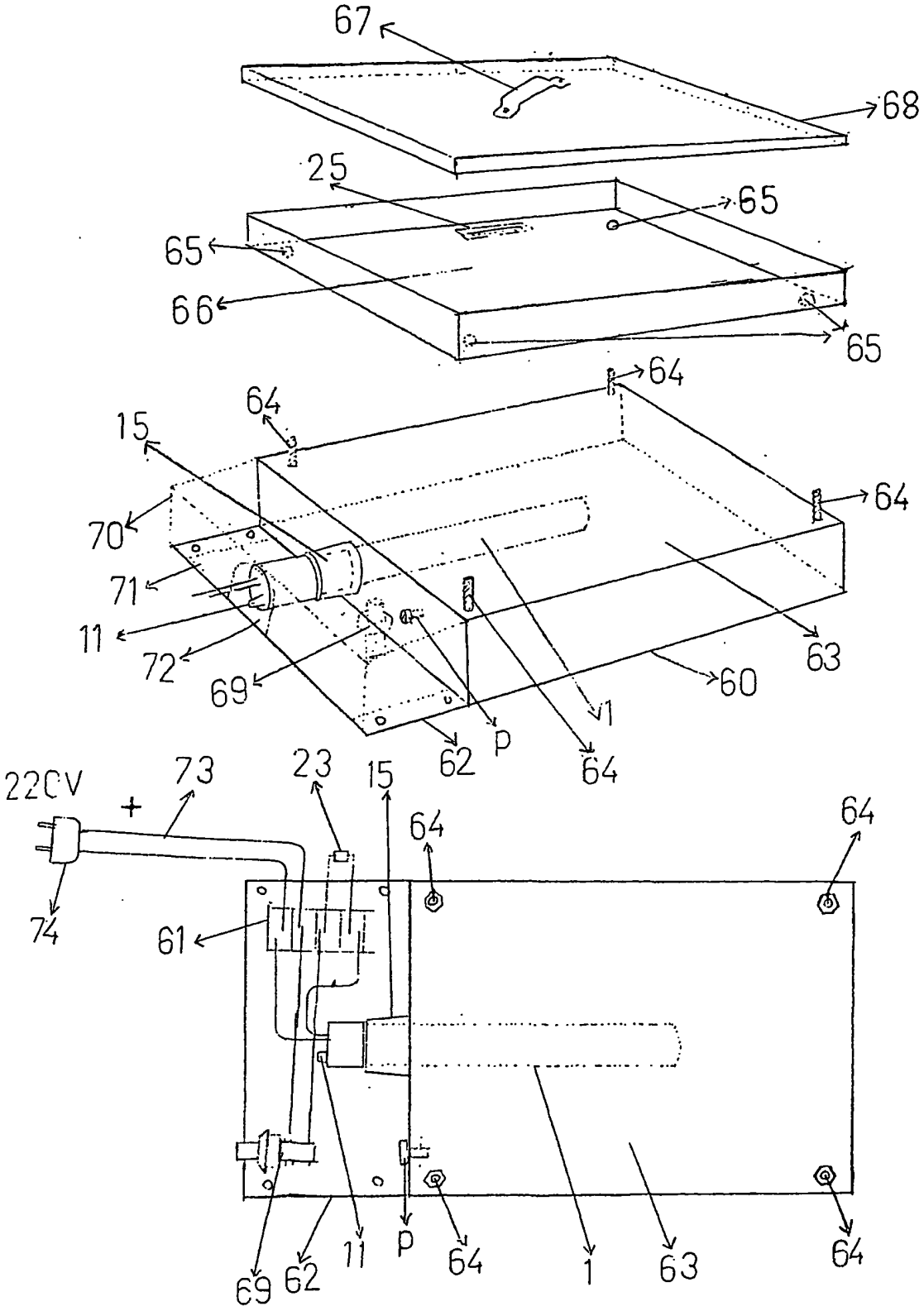
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FIGURE 4

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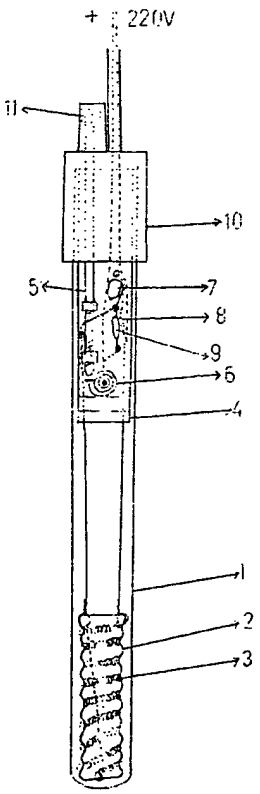
[Continued on next page]

(54) Title: WATER HEATING AND DISINFECTING DEVICE TO USED IN DENTISTRY UNITS AND OFFICES



(57) Abstract: The following problems were solved using a heat resistant transparent glass shielded heater. That water at nonnal room temperature is exlracted from the tip of the unit caps Viithout being heated may cause various problems. By connecting the subject device of invention to the systenl, warm water (35°C) can be given out of the tip of the cap, thus solving tOO aforementioned problem. Hot or warm wale: is generally required during tooth treatments. By using the second subject device of invention, it is possible to take hot or cold or wann water from the glass filler. When the injectors and ampoules used in anesthesia are cold, the patient may suffer pain during injection and sticking of the needle. By use of the device, the injector and ampoules are heated up to (33-36°C) and kept at the same temperature.The invention also relates to a device for disinfecting the water, wich comprises a 6 w fluorescent ultraviolet beam

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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IPC 7 A61C1/00 A01K63/06 F24H1/10 H05B3/46 H05B1/02
C02F1/02 C02F1/32 A61L2/04 F28D20/00 F24H7/04
B01L7/02 A61M5/44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61C A01K F24H H05B A61L C02F F28D B01L A61M A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
13 March 2003	28.03.03

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Ardhuin, H

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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